

IN THE CLAIMS:

Please write the claims to read as follows:

Please cancel claims 2 and 9-17 without prejudice.

1 1. (Currently Amended) A shutter mechanism for controlling reactants in a direct oxida-
2 tion fuel cell system, having at least one fuel cell including a membrane electrode assem-
3 bly, comprising:

4 a moving component disposed within the fuel cell between a source of a reactant
5 and the membrane electrode assembly, ~~and~~ said moving component having a plurality of
6 laterally displaced protrusions; and

7 a receiving element forming a plurality of laterally displaced openings corre-
8 sponding to the plurality of laterally displaced protrusions, having features formed therein
9 ~~that correspond with features on a receiving element~~ such that when said moving compo-
10 nent is placed adjacent to said receiving element, the flow of said reactant is controlled

1 2. (Cancelled)

1 3. (Original) The shutter mechanism as defined in claim 3 ~~1~~ wherein said moving com-
2 ponent is placed between a fuel source and an anode aspect of said fuel cell, and said re-
3 ceiving element is an anode current collector and when said moving component is placed
4 adjacent to said anode current collector, fuel flow to said anode aspect is restricted.

1 4. (Currently Amended) A shutter mechanism for a direct oxidation fuel cell system,
2 comprising:

3 (A) a fuel source;

- 4 (B) a direct oxidation fuel cell, including:
- 5 (i) a protonically conductive membrane having catalyst coatings on
- 6 each of its major surfaces, being an anode aspect and a cathode as-
- 7 pect;
- 8 (ii) an anode current collector disposed generally at said anode aspect;
- 9 (iii) a cathode current collector disposed generally at said cathode as-
- 10 pect;
- 11 (iv) a passive mass transport barrier disposed generally between said
- 12 fuel source and said anode aspect and spaced from said anode as-
- 13 pect to define a vapor gap in said fuel cell, said passive mass trans-
- 14 port barrier controlling a rate of fuel delivery to said catalyzed an-
- 15 ode aspect of said fuel cell;
- 16 (v) a movable shutter plate having a plurality of laterally displaced
- 17 protrusions disposed within said vapor gap between said passive
- 18 mass transport barrier and said anode current collector which
- 19 forms a plurality of laterally displaced openings corresponding to
- 20 the plurality of laterally displaced protrusions such that said mov-
- 21 able shutter plate is adjustable to substantially or partially prevent
- 22 fuel flow through said anode current collector to the anode aspect
- 23 of said fuel cell; and
- 24 (vi) a load coupled between said anode current collector and said cath-
- 25 ode current collector for utilizing the electricity generated by the
- 26 fuel cell.

1 5. (Currently Amended) The shutter mechanism as defined in claim 4 further comprising:

2 said movable plate having a plurality of protrusions disposed thereon correspond

3 ~~with openings in said anode current collector, configured~~ such that when said movable

4 plate is adjusted to a closed position, said protrusions interconnect with the openings in
5 the anode current collector to substantially seal said openings, and said movable plate
6 also having apertures therein interspersed with said protrusions in such a manner that
7 when said movable plate is in an open position, said apertures allow for flow of fuel ther-
8 ethrough; and

9 said movable plate is adjustable in a direction perpendicular to the plane in which
10 the plate is disposed, such that when it is adjusted, the plate travels generally in a z-axis
11 within said vapor gap, closer to or further away from said anode current collector, to con-
12 trol fuel flow while not consuming substantially additional volume within said fuel cell.

1 6. (Original) The shutter mechanism as defined in claim 5 further comprising:

2 said protrusions have angled sides; and

3 said openings in said anode current collector being correspondingly angled such
4 that said protrusions interconnect securely within said angled openings of said current
5 collector to substantially seal said openings against fuel flow.

1 7. (Original) The shutter mechanism as defined in claim 5 wherein said protrusions are
2 substantially comprised of a compliant material that is compressed into said openings
3 when said movable plate is adjusted to a closed position.

1 8. (Original) The shutter mechanism as defined in claim 5 further comprising a coating
2 disposed on the sides of said protrusions in said movable plate which further secures seal-
3 ing of said anode current collector against fuel flow therethrough.

1 9-17. (Cancelled)

Please insert the following new claims 18 *et seq.*:

- 1 18. (New) A method, comprising:
2 sourcing a reactant to a membrane electrode assembly; and
3 moving a movable component disposed within the fuel cell perpendicularly be-
4 tween a source of a reactant and the membrane electrode assembly having a plurality of
5 laterally displaced protrusions in relation to a receiving element to control the flow of the
6 reactant to the membrane electrode assembly.
- 1 19. (New) The method of claim 18, wherein the protrusions have angled sides and the
2 openings in the anode current collector are correspondingly angled such that the protru-
3 sions interconnect securely within the angled openings of the current collector to seal the
4 openings against fuel flow.
- 1 20. (New) The method of claim 18, wherein the protrusions are substantially comprised
2 of a compliant material that is compressed into the openings when the movable plate is
3 adjusted to a closed position.
- 1 21. (New) The method of claim 18, further comprising:
2 sealing of the anode current collector against fuel flow therethrough using a coat-
3 ing disposed on the sides of the protrusions in the movable component.
- 1 22. (New) The method of claim 18, wherein the movable component further comprises a
2 wide surface area as compared to a thickness of the movable component.

- 1 23. (New) The method of claim 18, further comprising:
2 vaporizing fuel as it flows through a passive barrier membrane toward the mem-
3 brane electrode assembly.
- 1 24. (New) The method of claim 18, wherein the movable component is disposed within
2 an anode vapor gap of the fuel cell.
- 1 25. (New) The method of claim 18, wherein the moveable component is utilized over a
2 plurality of fuel cells as a single plate.
- 1 26. (New) The method of claim 18, wherein the protrusions are disposed within the open-
2 ings of the membrane electrode assembly and are configured to move within the opening
3 to control the flow of the reactant.